

Work Order ID 137437

September 30, 2015 3:23:44 PM

U/R

137437

Page 1

Item ID: D350-748-103

Accept

N19000040100

Setup Start *NS1*

Revision ID: URF 15-561

Stop *NS2*

Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015 Start Qty: 1.00 *1*

Cust Item ID:

Required Date: 10/14/2015 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals: Process Plan: 544 20150930 Date: _____ Tooling: _____ Date: _____

Run Start *NR1*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D350-748-143	A U/R / OK	15/10/11	DAS	6					MW 15-11-20
100	Document Control	0.00	9-53						DAS 38 9-89
100	DOCUMENT CONTROL								
DC	Memo	0.00							15-12-11
Doc.Control -USB or Paperwork	Photocopy bluefile & type labels per PPPD350-748-103								
110		0.00							
110	BENDING MACHINE - CROSSTUBES								BC 15/11/12
CNC Bend 1	Memo	0.00							
CNC Delta 100 Bender	Bend tube as per Dwg D350-748-143 using CNC bender program D350F and Folio FT _____								
	****UNDER BEND .225" PER SIDE****								
	****USE (4) DT9824 SHIM BLOC TO CHECK STRAIGHTNESS****								

D350-748-103/137437

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QSI042) Approval Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval		
Description Work Order Deviation				Disposition					

Root Cause				FAULT CATEGORY			
Environment	☐	No Re-verification	☐	Pressure/Forced	☐	Temperature/Cure	☐
Design	☐	Operator	☐	Bending	☐	Set-up	☐
Doc/Data	☐	Offset/Setup	☐	Centre Not Concentric	☐	BOM/Route	☐
Equip/Tooling	☐	Supplier	☐	Cracks	☐	Broken/Damage/Defect	☐
Handling/Pre	☐	Training	☐	Crimp/Kink/Ripple/Wave	☐	Inspection Incomplete/Unqualified	☐
Material	☐	Use for Testing	☐	Cuffs	☐	Contamination	☐
Internal Transport	☐	Poor Information	☐	Crushing	☐	Countersink	☐
Tribal Knowledge	☐	Rushing	☐	Heat Treat	☐	Cut Too Short	☐
LOA	☐	Product Improvement	☐	Wave/Twist in Tube	☐	Instructions Incomplete/Unclear	☐
Substation	☐	Process Improvement	☐	Marks/Chatter	☐	Drill Holes	☐
Past Expiry Date	☐	Manufacturing Process	☐	OTHER :			
Misidentified	☐	Past Due	☐				

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Item ID: D350-748-103

Accept

N900040100Setup Start ***NS1***

Revision ID: URF 15-561

Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Stop ***NS2***

Start Date: 9/30/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 10/14/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start ***NR1***
Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
120		0.00							
120									
Crosstubes	Memo	0.00							
Crosstubes	***VERIFY CROSSTUBE DIMENSIONS AS PER DWG***								
				DAS 9 9-89					
				15-11-20					
127	QC15- Crosstube Dimensional Check	0.00							
127									
QC	Memo	0.00							
Quality Control	***MARK CUT LINES***								
									DAS 38 9-89 15-11-16
128		0.00							
128									
Crosstubes	Memo	0.00							
Crosstubes	CUT TUBE AT HEIGHT ON FAI SHEET								
	VERF HEIGHT <u>23.25</u> BY QC 15 LEVEL INSPECTOR <u>EB</u>								
	VERF TWIST <u>.056</u> BY QC15 LEVEL INSPECTOR <u>EB</u>								

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QSI042) Approval Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval		
Description Work Order Deviation				Disposition					
Root Cause		FAULT CATEGORY							
Environment ☐	No Re-verification ☐	Pressure/Forced ☐	Temperature/Cure ☐	Power Loss/Surge ☐	Positioned Wrong ☐				
Design ☐	Operator ☐	Bending ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐				
Doc/Data ☐	Offset/Setup ☐	Centre Not Concentric ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐				
Equip/Tooling ☐	Supplier ☐	Cracks ☐	Broken/Damage/Defect ☐	Weld ☐	Part Incorrect ☐				
Handling/Pre ☐	Training ☐	Crimp/Kink/Ripple/Wave ☐	Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐				
Material ☐	Use for Testing ☐	Cuffs ☐	Contamination ☐	Out of Sequence ☐	Part Moved ☐				
Internal Transport ☐	Poor Information ☐	Crushing ☐	Countersink ☐	Off-set ☐	Drawing ☐				
Tribal Knowledge ☐	Rushing ☐	Heat Treat ☐	Cut Too Short ☐	Mislabeled ☐	Finish ☐				
LOA ☐	Product Improvement ☐	Wave/Twist in Tube ☐	Instructions Incomplete/Unclear ☐	Fit/Function ☐	Misread ☐				
Substation ☐	Process Improvement ☐	Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐				
Past Expiry Date ☐	Manufacturing Process ☐	OTHER : _____							
Misidentified ☐	Past Due ☐								

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Item ID: D350-748-103 Accept ***N900040100*** Setup Start ***NS1***
 Revision ID: URF 15-561 Stop ***NS2***
 Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube
 Start Date: 9/30/2015 Start Qty: 1.00 ***1*** Cust Item ID:
 Required Date: 10/14/2015 Req'd Qty: 1.00 ***1*** Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	Crosstubes	0.00							
130									
Crosstubes	Memo	0.00							
Crosstubes									
	2- Drill Tube as per Dwg D350-748-143 Using DT8876 A,B & C Drill Jigs, Set-up drill table as per QSI 010								
	3- Deburr								
	4- Engrave Part # and Batch # as per Dwg D350-748-143								
	5- Remove all marks from tube within limits of D350-748-143								
	6- Apply a light coat of LPS3 on the interior of tube Batch: _____								
140	QC5- Inspect part completeness to step on W/O	0.00							
140									
QC	Memo	0.00							
Quality Control	CHECK 10 DEG HOLES WITH DT8876E (EUROCOPTER CLAMP)								

BC *15/11/17*

15-11-18

① 15-11-20 *DAS 9 9-89*

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Item ID: D350-748-103 Accept ***N900040100*** Setup Start ***NS1***
 Revision ID: URF 15-561 Stop ***NS2***
 Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube
 Start Date: 9/30/2015 Start Qty: 1.00 ***1*** Cust Item ID:
 Required Date: 10/14/2015 Req'd Qty: 1.00 ***1*** Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

174	Outsource process - NDT per QSI038 4.1	0.00							
174									
Outsource2	Memo	0.00							
Outsource process - NDT	ISSUE P/O TO ACUREN: <u>30533</u>								

CL NOV 23 2015 1

176	Receive & Inspect for Damage & Mat'l Certs	0.00							
176									
Packaging	Memo	0.00							
Packaging									

IX 8015-11-23

178	QC5- Inspect part completeness to step on W/O	0.00							
178									
QC	Memo	0.00							
Quality Control									

1 DAS
38
9-89
DEC 03 2015

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Item ID: D350-748-103 Accept ***N900040100*** Setup Start ***NS1***
Revision ID: URF 15-561 Stop ***NS2***
Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube
Start Date: 9/30/2015 Start Qty: 1.00 *1* Cust Item ID:
Required Date: 10/14/2015 Req'd Qty: 1.00 *1* Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
200		0.00							DAS
200	Crosstubes					1			41
Crosstubes									9-89
Crosstubes	Memo	0.00							15-11-26
	INSTALL GROUND WIRE INSERT, THEN INSERT SCREW AND WASHER								
	1-Abrade mating surfaces of support and crosstube with 180 grit sandpaper, clean the area with MEK or equivalent as per dwg								
	2-Install supports with Proseal 890 per D350-748-143 and QSI 015								
	A/R Proseal 890 Batch: <u>133071</u>								
	EXP: <u>2/16</u>								
	3-Install supports clamps Using Dt8876 as per Dwg D350-748-141, Torque to 60-80 IN-LBS.								
	PROSEAL CURE TIME 72 HOURS:								
	Start: <u>15-11-26</u>								
	Finish: <u>15-11-29</u>								
	RE-CHECK TORCQUE ON CLAMP AFTER PROSEAL HAS CURED FOR 72HOURS AS PER DWG.								

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Item ID: D350-748-103

Accept

N900040100Setup Start ***NS1***

Revision ID: URF 15-561

Stop ***NS2***

Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015 Start Qty: 1.00 ***1***

Cust Item ID:

Required Date: 10/14/2015 Req'd Qty: 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
240		0.00							
240	Packaging						DAS 28 9-89		DEC 11 2015
Packaging	Memo	0.00							
Packaging	Identify and pack for shipping as per PPP D350-748-103								
	Location: _____								
	PPP Rev: <u>Sold</u>								
250	QC21- Final Inspection - Work Order Release	0.00							
250									DEC 11 2015
QC	Memo	0.00							
Quality Control									

MCS DEC 11 2015

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Work Order ID: 137437

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Parent Item: D350-748-103

D350-748-103

Parent Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015

Required Date: 10/14/2015

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP REV:A 15.03.23 NEW ISSUE DD VERF:JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D350-748-143TRN		Manufactured	No				Each	9.0000		1			

D350-748-143TRN

SS Crosstube Turning Detail

Location	Loc Qty	Loc Code
LG003	9	
129473	1	
135154	1	
135156	1	
135157	1	
135158	1	
135159	1	
135160	1	
135161	1	
135162	1	

① TW 15-11-12

DAS 41 9-89 15-11-30

D3502-1

Manufactured No

Each 28.0000

2

D3502-1

Support

Location	Loc Qty	Loc Code
LG052	28	
130349	28	

2

DAS 41 9-89 15-11-30

D5123-7

Manufactured No

Each 54.0000

2

D5123-7

Clamp Cushion

Location	Loc Qty	Loc Code
LG052	54	
131194	16	
133492	12	
136671	26	

2

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Work Order ID: 137437

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Parent Item: D350-748-103

D350-748-103

Parent Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015

Required Date: 10/14/2015

Start Qty: 1.00

Required Qty: 1.00

AETC-1032

Purchased

No

Each

20.0000

1

DAS

AETC-1032

41

9-89

15-12-2

Insert

Location

Loc Qty

Loc Code

ST547

20

m133002

20

Each

1,140.000

1

DAS

41

9-89

15-12-2

NAS1149C0363R

Purchased

No

NAS1149C0363R

Washer

Location

Loc Qty

Loc Code

FP001

60

114742

60

GA

506

m133077

506

ST260a

494

m133077

494

ST271

80

m130673

20

m132763

60

Each

126.0000

2

DAS

41

9-89

15-11-30

MS21920-20

Purchased

No

MS21920-20

Clamp

Location

Loc Qty

Loc Code

FG

2

122254

2

LG

50

m133134

50

LG050

7

m128650

7

LG056

67

m132675

67

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Work Order ID: 137437

137437

Parent Item: D350-748-103

D350-748-103

Parent Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015

Required Date: 10/14/2015

Start Qty: 1.00

Required Qty: 1.00

MS51958-63

Purchased

No

Each

42.0000

1

DAS

MS51958-63

**

41

9-89

15-12-2

Screw

~~DAS~~
~~38~~
~~9-89~~

Location

Loc Qty

Loc Code

ST273

42

m131886

42

AN4-6A

Purchased

No

220

Each

242.0000

16

16

AN4-6A

**

133310

BOLT

DAS
38
9-89

Location

Loc Qty

Loc Code

CA

143

M128403

43

M130851

100

ST345

99

M128403

8

M131153

91

D3500-1

Manufactured

No

220

Each

11.0000

4

4

D3500-1

**

B138953

Saddle

DAS
38
9-89

Location

Loc Qty

Loc Code

ST406

11

129372

10

131168

1

NOV 26 2015

DAS
28
9-89

DAS
28
9-89

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Work Order ID: 137437

137437

Parent Item: D350-748-103

D350-748-103

Parent Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015

Required Date: 10/14/2015

Start Qty: 1.00

Required Qty: 1.00

AN5-32A

Purchased

No

220

Each

89.0000

4

4

AN5-32A

Bolt

DAS
38
9-89

Location

Loc Qty

Loc Code

ST299A

30

m132857

30

ST336

52

m132536

52

ST337

7

m131139

7

NAS1149D0463J

Purchased

No

220

Each

2,505.000

32

32

NAS1149D0463J

WASHER

DAS
38
9-89

Location

Loc Qty

Loc Code

GA

41

M129390

41

ST269

2464

M129682

86

M130799

371

M132317

125

M132677

888

M133077

994

NOV 26 2015

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Work Order ID: 137437

137437

Parent Item: D350-748-103

D350-748-103

Parent Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015

Required Date: 10/14/2015

Start Qty: 1.00

Required Qty: 1.00

D3501-1	Manufactured	No	220	Each	327.0000	16	16		DAS 8 9-89
D3501-1									DAS 28 9-89
Bushing									
DAS 38 9-89									
	<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>				
	ST039		176						
	130742		14						
	135919		162			16			
	ST046		1						
	125925		1						
	ST051A		150						
	135918		150						
AN4-41A	Purchased	No	220	Each	187.0000	8	8		DAS 8 9-89
AN4-41A									DAS 28 9-89
Bolt									
DAS 38 9-89									
	<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>				
	ST312A		138						
	m130726		8						
	m132189		130						
	ST342		49						
	m130716		49			8			
MS21042L5	Purchased	No	220	Each	391.0000	4	4		DAS 8 9-89
MS21042L5									DAS 28 9-89
Nut									
DAS 38 9-89									
	<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>				
	GA		146						
	m127813		146						
	ST260a		197						
	m132677		197						
	ST305		48						
	m127813		19						
	m131340		21						
	m132123		8						

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Work Order ID: 137437

137437

Parent Item: D350-748-103

D350-748-103

Parent Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015

Required Date: 10/14/2015

Start Qty: 1.00

Required Qty: 1.00

MS21042L4

Purchased

No

220

Each

1,426.000

24

24

MS21042L 4

DAS

38

9-89

Locknut

1333263

NOV 26 2015

Location

Loc Qty

Loc Code

FP001

2

m124231

2

GA

112

m127813

112

ST260a

170

m130799

56

m131803

6

m132262

108

ST305

1142

m128300

8

m130388

7

m130922

97

m131618

12

m132123

56

m132382

962

DAS

6

9-89

DAS

28

9-89

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Work Order ID: 137437

137437

Parent Item: D350-748-103

D350-748-103

Parent Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015

Required Date: 10/14/2015

Start Qty: 1.00

Required Qty: 1.00

NAS1149D0563J

Purchased

No

220

Each

964.0000

8

8

NOV 26 2015

NAS1149D0563J

Washer

MR33363

DAS

8

DAS
38
9-89

Location

Loc Qty

Loc Code

GA

53

m125807

53

ST260a

428

m130799

63

m132035

55

m132256

10

m133134

300

ST269

464

m128257

156

m132677

308

ST271

19

m131026

19

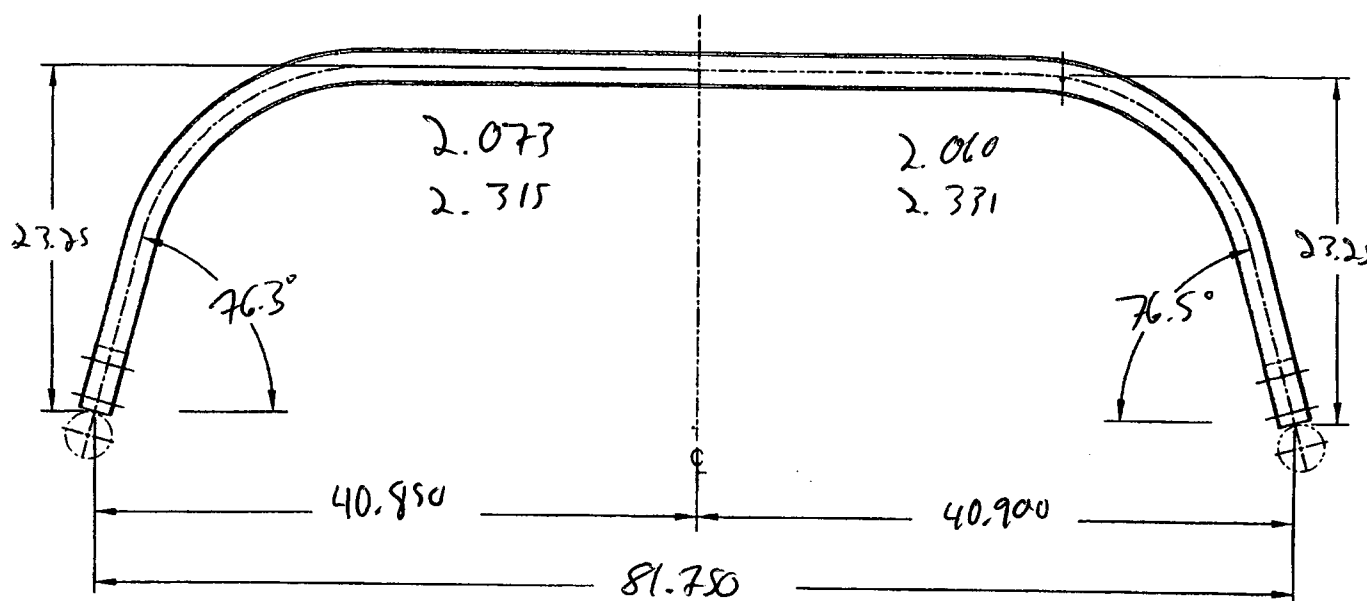
DAS

28

9-89

DART AEROSPACE LTD		Work Order:	137437
Description: Crosstube High Fwd, SS (AS350/355)		Part Number:	D350-748-103
Inspection Dwg: D350-748-143	Rev: A	Page 1 of 1	

Required Dimension	Min	Max
Height	23.00	23.50
1/2 Span	40.77	41.03
Angle	75	77
Total Span	81.55	82.05
Bending Passes	7	--
Crushing	--	8%
Twist	--	0.38



	Side A	Side B
Bending Passes	29	31
Crushing	5.5%	6.1%
Comments		

QC15 Inspection		DAS
		33
Date		9-89 15-11-16

Rev	Date	Change	Revised by	Approved
A	15.09.09	New Issue	KJ	AA

Item	Qty	Part Number	Description
	X	D350-748-143	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
1	1	D6021-125	CROSSTUBE
2	2	D3502-1	SUPPORT
3	2	D5123-7	CLAMP CUSHION
4	1	AETC-1032	INSERT
5	2	MS21920-20 OR MS21920-21/-22	CLAMP (PER DART SPEC. M-MS21920-20/-21/-22)
6	1	NAS1149C0363R	WASHER (OR AN960C10)
7	1	NAS1635-3-8	SCREW (OR MS51958-63)
8	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6021-125 (17-4PH)
FINISHED LENGTH AFTER TURNING = 112.270 ± 0.06 (AFTER BENDING/TRIMMING = 110.27 REF)
- 2) FINISH: PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCE: PER DART QSI 018 UNLESS OTHERWISE NOTED.
WALL THICKNESS ECCENTRICITY PER DART QSI 038 7.2
MIN. ALLOWABLE WALL IS -0.020 FROM NOMINAL
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: DART PART NUMBER 'D350-748-143' AND BATCH NUMBER ON INSIDE OF CUFF
PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 30.45 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.290 HOLE.
- 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.

TURNING

- 10) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.

BENDING

- 11) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES PER SIDE. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D. ON TOP HALF OF BEND, AND 8% ON BOTTOM HALF OF BEND.
- 12) MAX AMPLITUDE OF RIBBLING ALONG BENT PORTION OF THE TUBE IS 0.030 (ZN A1-3)
- 13) MAX TWIST: WITH XTUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.38 (ZN C1-3).

ASSEMBLY

- 14) TO INSTALL D3502-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.02" TO 0.05" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 80 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

UNDER REVIEW

15/4/24

REF 15.561

20150930

SH 137437

RELEASED

2015 MAR 18

REF 15-547

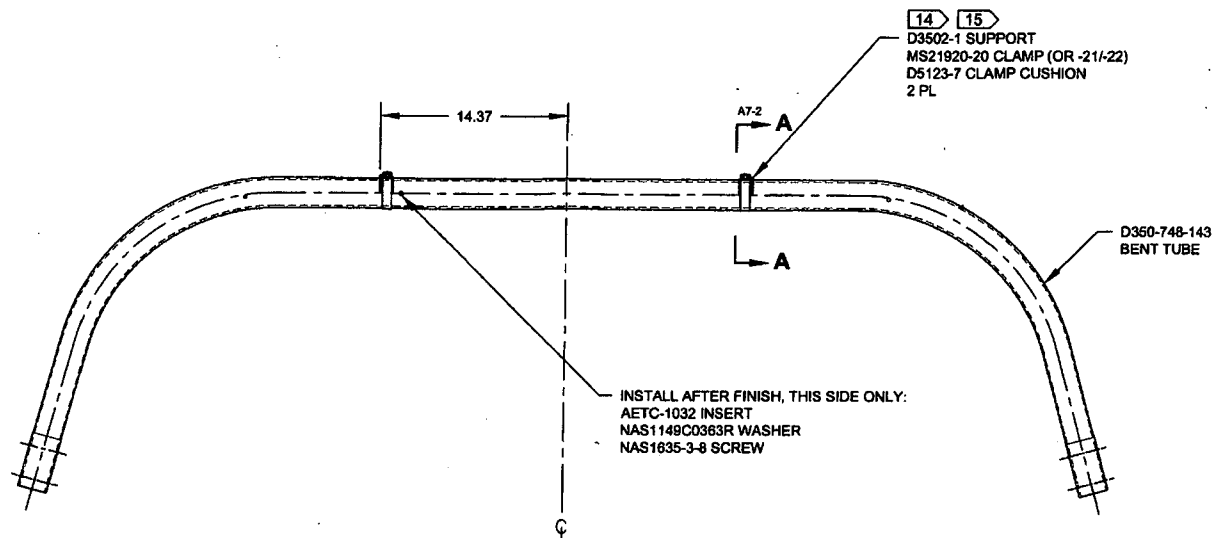
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REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	15.01.21		

DART AEROSPACE LTD
HAWKESBURY, ONTARIO, CANADA

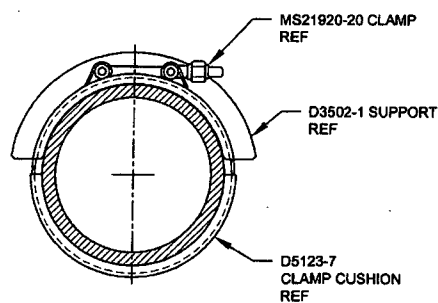
DRAWING NO. D350-748-143
TITLE CROSSTUBE (AS 350/355 HI FWD)

REV. A
SHEET 1 OF 4
SCALE
NTS

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**D350-748-143
ASSEMBLY DETAIL**



SECTION A-A D4-2
SCALE 6X

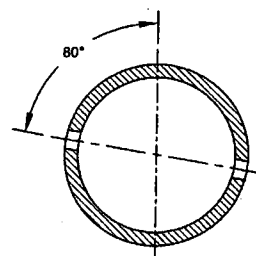
UNDER REVIEW
4/15/14/23

RELEASED
2015 MAR 18
42 ECU-15-547

DESIGN		DART AEROSPACE LTD	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. A
MFG. APPR.		D350-748-143	SHEET 2 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	15.01.21	COPYRIGHT © 2016 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	



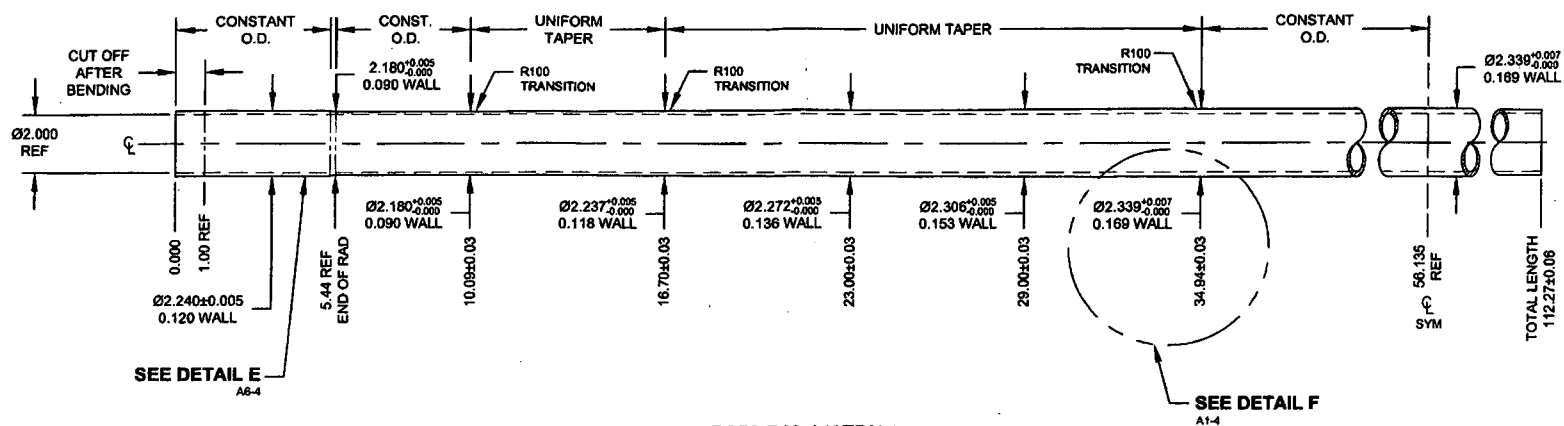
2015 MAR 18



SECTION B-B D3-3
SCALE 6X

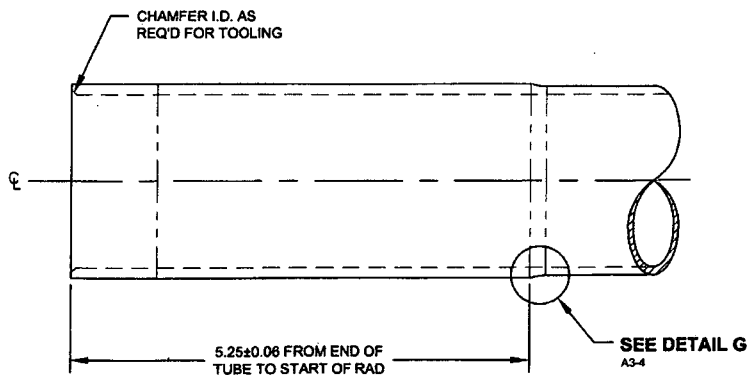


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NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT
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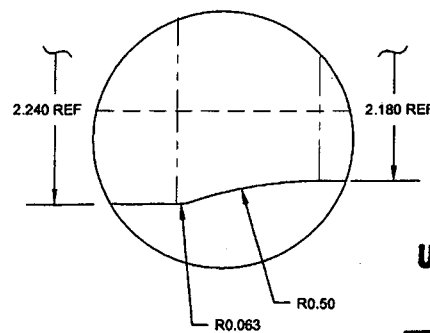


**D350-748-143TRN
TURNING DETAIL**

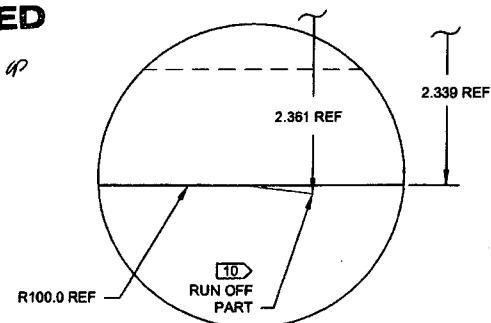
RELEASED
2015 MAR 18



**DETAIL E:
CROSSTUBE CUFF** C7-4
SCALE 3X



**DETAIL G:
CUFF TRANSITION** A5-4
NOT TO SCALE



**DETAIL F:
TOOL RUN-OFF** C3-4
NOT TO SCALE

UNDER REVIEW
15/4/24

DESIGN		DART AEROSPACE LTD	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. A
MFG. APPR.		D350-748-143	SHEET 4 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	15.01.21	COPYRIGHT © 2015 BY DART AEROSPACE LTD	
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DQA:

Date: 16/02/04

WORK ORDER NON-CONFORMANCE / UPDATE

Work Order update only

QA Closed:

Date: 16/02/03

Work Order:

137437

DISPOSITION

Rework



Scrap



Use-as-is



Suspected Unapproved



AGAINST DEPARTMENT/PROCESS

Skid-tube



Machining



Thermoforming



Large Fab



Cross tube



Small Fab



Finishing



Composite



Water Jet



Prod. Eng. Coord.



Rec/Store/Packaging



Supplier



Engineering



Quality



Other



Part No.

D350-748-203

NCR No.

16-556

Date:

15/10/1

Step #:

180

QTY Effective:

1

MRB (QSI042) Approval

DAS

12

9-89

15/10/1

Description Work Order Deviation

Disposition

Prep surface per QSI 005 4.1.4

Axcelite 132058 BIN: 132520

Axcelite Metablok 2305 B/N: 132474

Completed By

DAS

41

9-89

15-11-25

Lead hand / Supervisor

Approval Verification

16/02/02

QC / QA Coordinator

Approval

16/02/02

Root Cause

FAULT CATEGORY

Environment



Design



Doc/Data



Equip/Tooling



Handling/Pre



Material



Internal Transport



Tribal Knowledge



LOA



Substation



Past Expiry Date



Misidentified



No Re-verification

Operator

Offset/Setup

Supplier

Training

Use for Testing

Poor Information

Rushing

Product Improvement

Process Improvement

Manufacturing Process

Past Due

Pressure/Forced

Bending

Centre Not Concentric

Cracks

Crimp/Kink/Ripple/Wave

Cuffs

Crushing

Heat Treat

Wave/Twist in Tube

Marks/Chatter

Temperature/Cure

Set-up

BOM/Route

Broken/Damage/Defect

Inspection Incomplete/Unqualified

Contamination

Countersink

Cut Too Short

Instructions Incomplete/Unclear

Drill Holes

Power Loss/Surge

Folio/Program

Grain

Weld

Wrong Stock Pulled

Out of Sequence

Off-set

Mislabelled

Fit/Function

Misaligned/off center

Positioned Wrong

Outside Dimensions

Over/Under tolerance

Part Incorrect

Part Lost/Missing

Part Moved

Drawing

Finish

Misread

Turning Sequence

OTHER:



Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDER

Purchase Order ID **PO30533**

Purchase Order Date 11/20/2015

PO Print Date 11/23/2015

Page Number 2 of 6

Order From :

VC-SKY001

Ship To : DART AEROSPACE LTD

SKYSERVICE
6120 MIDFIELD ROAD
MISSISSAUGA, ONTARIO L5P 1B1
CANADA

1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA

Contact Name

Vendor Phone

905-678-5636

Ship To Contact

Ship To Phone

Ship Via:

Delivered

Ship Acct:

Buyer

Chantal Lavoie

Customer POID

Customer Tax #

10127-2607

Terms

Net 30

Currency

CAD

FOB

FCA - (Free Carrier)

Line Total: \$115.00

3	138508	D212-664-207 CROSSTUBE	11/23/2015	1.00	\$115.00	\$115.00
---	--------	---------------------------	------------	------	----------	----------

Yes

11/23/2015

SAME AS ABOVE

Line Total: \$115.00

4	137436	D350-748-103 CROSSTUBE	11/23/2015	1.00	\$115.00	\$115.00
---	--------	---------------------------	------------	------	----------	----------

Yes

11/23/2015

SAME AS ABOVE

Line Total: \$115.00

5	137437	D350-748-103 CROSSTUBE	11/23/2015	1.00	\$115.00	\$115.00
---	--------	---------------------------	------------	------	----------	----------

Yes

11/23/2015

SAME AS ABOVE

Note:

11/23/2015

SP 15-11-23



skyservice Work Order Traveler

Sky Service F.B.O. Inc.

DOT APP 53-89 / EASA 145.7142 / BDA AMQ 385

WO #: MWO26474	Customer: Dart Aerospace Ltd.	Dept: NDT YUL	Reference: 30533
Descr:	PN:	S/N:	Qty: 1
Make:	Model:	Reg:	A/C S/N:
TSN:	CSN:	TSO:	
Task: UNSCHEDULED			Sequence: 1

Work Required:

CARRY OUT NDT ON 13 CROSSTUBES AS PER PO30533

2 AFT CROSSTUBES, ITEM ID# D212-664-207 , WORK ORDERS ID# 136710, 138508

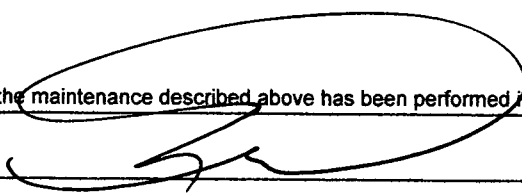
6 STAINLESS STEEL AFT CROSSTUBES, ITEM ID# D350-748-203 , WORK ORDERS ID# 138647, 138648, 138649, 138650, 138661, 138662

5 STAINLESS STEEL FWD CROSSTUBES, ITEM ID# D350-748-103 , WORK ORDERS ID# 137437, 137438, 138714, 137436, 137439

SP 15-11-23

Action Taken:						Date:	Initial/Stamp:
LPI C/O IAW ASTM E-1417M13 NO CRACK FOUND PEN. ZL-56, MPO13600, UV M-20141, CLEANER SKC-S MPO13923 , DEV. MPO11715						NOV 20 2015	 
Description	Location	P/N	Qty	Batch	S/N Off	S/N On	

I certified that the maintenance described above has been performed in accordance with the applicable standard of airworthiness.

Signature: 	ACA/SCA Stamp 	Date: NOV 20 2015
Name: RAFIK MELIKIAN		

4.0 WEIGHT AND BALANCE

The following weight and balance information is for Dart crosstube installations only. This data should be similar to the existing installation. Differences from the parts removed are the responsibility of the installer.

DART CROSSTUBE	FWD/AFT	WEIGHT	STA	MOMENT
D350-748-101	Fwd	35.2 lb	106.3 in	3742 lb-in
D350-748-103		(16.0 kg)	(2.70 m)	(43.2 kg-m)
D350-748-201	Aft	34.7 lb	162.4 in	5635 lb-in
D350-748-203		(15.7 kg)	(4.12 m)	(64.7 kg-m)

5.0 PARTS LIST

Qty -101	Qty -103	Qty -201	Qty -203	Part Number	Description
X				D350-748-101	CROSSTUBE INSTALLATION, AS 350/355 HIGH FWD
	X			D350-748-103	CROSSTUBE INSTALLATION, AS 350/355 HIGH FWD (SS)
		X		D350-748-201	CROSSTUBE INSTALLATION, AS 350/355 HIGH AFT
			X	D350-748-203	CROSSTUBE INSTALLATION, AS 350/355 HIGH AFT (SS)
1				D350-748-141	CROSSTUBE ASSEMBLY, AS 350/355 HIGH FWD
	1			D350-748-143	CROSSTUBE ASSEMBLY, AS 350/355 HIGH FWD (SS)
		1		D350-748-241	CROSSTUBE ASSEMBLY, AS 350/355 HIGH AFT
			1	D350-748-243	CROSSTUBE ASSEMBLY, AS 350/355 HIGH AFT (SS)
*2	*2	*2	*2	D3502-1	SUPPORT
*2	*2	*2	*2	D5123-7	CLAMP CUSHION
*1		*1		AELS-1032-225	INSERT
	*1		*1	AETC-1032	INSERT
*2	*2	*2	*2	MS21920-20	CLAMP (OR MS21920-21/-22)
*1		*1		MS27039-1-10	SCREW
	*1		*1	NAS1685-3-8	SCREW (OR MS51958-63)
*1		*1		NAS1149D0363J	WASHER (OR AN960JD10)
	*1		*1	NAS1149C0363R	WASHER (OR AN960C10)
4	4	4	4	D3500-1	SADDLE
16	16	16	16	D3501-1	BUSHING
16	16	16	16	AN4-6A	BOLT
8	8	8	8	AN4-41A	BOLT
4	4	4	4	AN5-32A	BOLT
32	32	32	32	NAS1149D0463J	WASHER (OR AN960JD416)
8	8	8	8	NAS1149D0563J	WASHER (OR AN960JD516)
24	24	24	24	MS21042L4	NUT (OR MS21042-4)
4	4	4	4	MS21042L5	NUT (OR MS21042-5)

* REFERENCE ONLY. PARTS ARE INCLUDED IN D350-748-141/-143/-241/-243 ASSEMBLIES ABOVE

QA Closed:

Date:

WORK ORDER NON-CONFORMANCE / UPDATE

Work Order: 137437Part No. 030-748-103

NCR No.

DISPOSITION

Rework ☒
 Scrap ☐
 Use-as-is ☐
 Suspected Unapproved ☐

Work Order update only ☐

AGAINST DEPARTMENT/PROCESS

Skid-tube ☐
 Machining ☐
 Thermoforming ☐
 Large Fab ☐

Cross tube ☐
 Small Fab ☐
 Finishing ☐
 Composite ☐

Water Jet ☐
 Prod. Eng. Coord. ☐
 Rec/Store/Packaging ☐
 Supplier ☐

Engineering ☐
 Quality ☐
 Other ☐

Date: 15.11.26

Step #:

QTY Effective:

Description Work Order Deviation

AEC-1032 INSERTS BREAKING ON INSTALLATION

DAS
9
9-89

Disposition

BASED ON ENG TESTING IT WAS
 FOUND THAT INSTALLATION IS MORE
 RELIABLE IF INSTALLATION PRESSURE (AIR
 HOSE) IS REGULATED TO 50 PSI
 AND INSTALLATION HOLE IS REAMED
 TO Ø 0.290 IN ACCORDANCE MANUFACTURERS
 INSTRUCTIONS. OPEN PAR TO ADD
 NOTE TO STEP # 200 WHICH READS
 "LIMIT AIR PRESSURE TO 50PSI WHEN
 INSTALLING AEC-1032 INSERT AND
 ONLY EXPAND INSERT ONCE"

MRB (QSI042) Approval

Al
15.11.26

Completed By

Lead hand / Supervisor
Approval VerificationQC / QA Coordinator
Approval

Root Cause

Environment ☐ No Re-verification ☐
 Design ☐ Operator ☐
 Doc/Data ☐ Offset/Setup ☐
 Equip/Tooling ☐ Supplier ☐
 Handling/Pre ☐ Training ☐
 Material ☐ Use for Testing ☐
 Internal Transport ☐ Poor Information ☐
 Tribal Knowledge ☐ Rushing ☐
 LOA ☐ Product Improvement ☐
 Substation ☐ Process Improvement ☐
 Past Expiry Date ☐ Manufacturing Process ☐
 Misidentified ☐ Past Due ☐

Pressure/Forced ☐
 Bending ☐
 Centre Not Concentric ☐
 Cracks ☐
 Crimp/Kink/Ripple/Wave ☐
 Cuffs ☐
 Crushing ☐
 Heat Treat ☐
 Wave/Twist in Tube ☐
 Marks/Chatter ☐

FAULT CATEGORY

Temperature/Cure ☐
 Set-up ☐
 BOM/Route ☐
 Broken/Damage/Defect ☐
 Inspection Incomplete/Unqualified ☐
 Contamination ☐
 Countersink ☐
 Cut Too Short ☐
 Instructions Incomplete/Unclear ☐
 Drill Holes ☐

Power Loss/Surge ☐
 Folio/Program ☐
 Grain ☐
 Weld ☐
 Wrong Stock Pulled ☐
 Out of Sequence ☐
 Off-set ☐
 Misabeled ☐
 Fit/Function ☐
 Misaligned/off center ☐

Positioned Wrong ☐
 Outside Dimensions ☐
 Over/Under tolerance ☐
 Part Incorrect ☐
 Part Lost/Missing ☐
 Part Moved ☐
 Drawing ☐
 Finish ☐
 Misread ☐
 Turning Sequence ☐

OTHER:

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☒

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☒ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☒ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐									
Date : 16-01-19		Step #: 200		QTY Effective : ①		MRB (QSI042) Approval							
						DAS 9 9-89 16-01-18 Completed By DAS 10 9-89 16-01-19 Lead hand / Supervisor Approval Verification DAS 9 9-89 16-01-19 QC / QA Coordinator Approval DAS 9 9-89 16-01-19							
Description Work Order Deviation AETC-1032 inserts breaking on installation P.C. equipment, no air regulator on tool				Disposition had on work order to limit air pressure to 50 psi when installing AETC-1032 insert									
Root Cause <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%; vertical-align: top;"> Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☒ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐ </td> <td style="width:50%; vertical-align: top;"> No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐ </td> </tr> </table>				Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☒ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐	No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐	FAULT CATEGORY <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:33%; vertical-align: top;"> Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐ </td> <td style="width:33%; vertical-align: top;"> Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☒ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐ </td> <td style="width:33%; vertical-align: top;"> Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Mislabelled ☐ Fit/Function ☐ Misaligned/off center ☐ </td> <td style="width:33%; vertical-align: top;"> Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐ </td> </tr> </table>				Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐	Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☒ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐	Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Mislabelled ☐ Fit/Function ☐ Misaligned/off center ☐	Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐
Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☒ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐	No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐												
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				OTHER : _____									